Submitted Abstract

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Abstract

In the context of the hydrological drought in Northern Italy in 2022, we analyzed current and past snow line elevation (SLE) dynamics in nine catchments in the southern Alps. The SLE time series ranging from 1985 to July 2022 were derived from a total of 4500 multi-spectral Landsat satellite acquisitions on a catchment basis. The comparison of the SLE dynamics for the hydrological year 2021/22 with the long-term observations showed that the expected median SLE was exceeded by several hundred meters from January to March 2022. We linked these observations to products of the Alpine Drought Observatory (ADO) project, namely the Standardised Snowpack Index (SSPI) and river discharge in order to assess the relation between the location of the winter SLE, water storage in the snowpack (snow water equivalent, SWE), and river discharge in spring. We expect the winter SLE position derived from timely satellite imagery to have the potential for serving as an early warning indicator for upcoming hydrological droughts in the Alpine region for the spring season in the future. The presentation will give an overview of the satellite processing workflow, the SLE derivation and their long-term median statistics as well as an illustration of the 2022 SLE situation and the connection to the ADO parameters mentioned above.